

**Remarks/Arguments:**

Claims 9-11, 14, 15, 21-23, 26, 27, 29, 30, and 34-37 were the pending claims in this application. With this amendment, claims 9, 21, 34 and 36 have been amended and new claims 38-50 have been added. Therefore, claims 9-11, 14, 15, 21-23, 26, 27, 29, 30, and 34-50 are currently pending in the application.

New claims 38-49 find support in claims 9-11, 14, 15, 21-23, 26, 27, 29, and 30, respectively, with the added feature of "a support." Support for this added feature can be found, for example, at page 3, lines 13-16. New claim 50 finds support from claim 35, from which claim 50 depends.

Claims 9-11, 14, 15, 21-23, 26, 27, 29, 30 and 34-36 stand rejected under 35 U.S.C. § 112, first paragraph. Applicant has amended claims 9, 21, 34 and 36 in response to these rejections. Therefore, the rejection of claims 9-11, 14, 15, 21-23, 26, 27, 29, 30 and 34-36 has been obviated.

Claims 9-11, 14, 15, 21-23, 26, 27, 29, 30 and 34-37 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,665,318 ("Rembold") in view of U.S. Patent No. 5,330,732 ("Ishibashi") in view of U.S. Patent No. 3,331,787 ("Keith"). Claims 9-11, 14, 15, 21-23, 26, 27, 29, 30 and 34-37 stand rejected as obvious under U.S. Patent No. 5,552, 218 ("Lane") in view of Ishibashi in view of Keith. Applicant respectfully traverses the rejections and submits that the currently pending amended claims are patentable over the cited references for at least the reasons set forth below.

**Features of Independent Claims**

Applicant's invention, as recited by independent claim 9, includes features which are neither disclosed nor suggested by the art of record. For example, claim 9 recites:

***a platinum catalyst for reducing NO<sub>x</sub> to N<sub>2</sub> present in the lean NO<sub>x</sub> catalyst system at a loading of < 30g/ft<sup>3</sup>*** (emphasis added).

Applicant's invention as claimed in claim 9 is directed to an emission control system for treating exhaust gas. The system includes, among other features, a lean NO<sub>x</sub> catalyst system consisting of a platinum catalyst for reducing a platinum catalyst for reducing NO<sub>x</sub> to N<sub>2</sub> present in the lean NO<sub>x</sub> catalyst system at a loading of < 30g/ft<sup>3</sup>. By including this feature, which is

directed to a low loading of a catalytically active component, the invention provides an increased selectivity of the catalyst system towards NO<sub>x</sub> reduction. Independent claims 21, 34, 36-38 and 43, while not identical to claim 9, include features similar to claim 9.

### **Response to Rejections Based on Rembold in view of Ishibashi in view of Keith**

The Office Action rejects claim 9 based on Rembold in view of Ishibashi in view of Keith. Applicant contends, however, that the Office Action has not presented a *prima facie* case of obviousness based on Rembold in view of Ishibashi in view of Keith. More specifically, the Office Action relies on Ishibashi, asserting that Ishibashi discloses the feature of a platinum catalyst for reducing NO<sub>x</sub> to N<sub>2</sub> present in the lean NO<sub>x</sub> catalyst system at a loading of < 30g/ft<sup>3</sup>. Applicant contends that Ishibashi, when considered in its entirety, does not teach, disclose or suggest this feature.

Ishibashi discloses a catalyst for purifying exhaust gases including a catalyst support, a zeolite layer adhered to and formed on the catalyst support, and at least one noble metal. (col. 2, lines 8-11). The noble metal is selected from the group consisting of platinum, palladium and rhodium loaded into the zeolite layer by a predetermined amount or more. (col. 2, lines 11-15). When platinum is used, 1.3 parts by weight or more is loaded onto the zeolite layer. (col. 2, lines 15-17). Applicant submits that when 1.3 parts by weight is calculated into its equivalent g/ft<sup>3</sup> loading, as discussed below, Ishibashi's platinum catalyst loading is at least 44 g/ft<sup>3</sup>. Applicant submits that this value is well above Applicant's claimed platinum loading of < 30 g/ft<sup>3</sup> claimed recited by claim 9.

In Table 1, for Na-ZSM-5, a g/liter of 1.73 correlates to a parts by weight of 1.44, *i.e.* one needs to multiply parts by weight by 1.2 to obtain the g/liter loading equivalent. Similarly, other loadings include: Na-mordenite (1.73/1.44), Na-Y type zeolite (1.72/1.43) and in Table 4, for H-ZSM-5 (1.72/1.43), H-mordenite (1.70/1.42), H-Y type zeolite (1.71/1.43). Given that there are 28.3 liters per cubic foot, to convert the 1.3 parts by weight platinum loading or more taught by Ishibashi, for example, in claim 1, one must multiply this number by 1.2. The result is 1.56. Therefore, 1.56 x 28.3 equals 44 g/ft<sup>3</sup> or more.

Applicant acknowledges that in both Tables 1 and 4 of Ishibashi, Ishibashi includes samples of loadings that are below 30 g/ft<sup>3</sup>. However, Applicant contends that, when Ishibashi is read in its entirety, Ishibashi teaches away from Applicant's invention including the feature of

a platinum catalyst with a loading of  $< 30\text{g/ft}^3$ . Under well-established patent law, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. M.P.E.P. § 2141.02 (*citing W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)). Moreover, Applicant acknowledges that "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed . . . ." M.P.E.P. § 2141.02 (*citing In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004)). Applicant submits, however, that the teaching in Tables 1 and 4 of loadings that are below  $< 30\text{g/ft}^3$ , when read in the context of the entirety of Ishibashi, are not merely alternatives. Rather, the examples are listed to show the grossly inadequate effect of loadings lower than 1.3 parts by weight or more of platinum for converting nitrogen oxides after being subjected to a high temperature durability test. Thus, Applicant contends such disclosure would, in fact, "discourage" one of ordinary skill in the art from including loadings  $< 30\text{ g/ft}^3$ , as Applicant has claimed, especially when interpreted in the context of Ishibashi's further teachings.

Applicant submits that Ishibashi teaches that "[o]ne of the major features" of its invention is that at least one noble metal is loaded onto a zeolite layer in a predetermined amount or more. (col. 2, lines 47-49). Specifically, Ishibashi discloses that after high durability tests, conversions of nitrogen oxides increases sharply at "special loading amounts of the respective noble metals." (col. 2, lines 59-62). Even more specifically, Ishibashi teaches that the "special loading amount" for platinum is a loading of *1.3 parts by weight or more*. (col. 2, lines 62-66). As further stated by Ishibashi, "conversions of nitrogen oxides were improved *remarkably* at the platinum loading amounts of 1.3 parts by weight or more." (emphasis added) (col. 8, lines 12-14). As a result, "the catalysts of the present invention is [*sic*] superior to the comparative catalysts . . . ." (col. 8, lines 31-32).

Perhaps even more telling is the teaching of Tables 1 and 4 themselves. For example, in Table 1 the samples having the lowest loadings, including loadings of 0.15 ( $5.097\text{ g/ft}^3$ ) and 0.41 ( $13.93\text{ g/ft}^3$ ), the percent NO<sub>x</sub> conversion is 0 and 7, respectively. Even the loading of 0.78 ( $26.51\text{ g/ft}^3$ ), which is near the upper limit of that claimed by Applicant, has a 10% conversion. However, the remaining platinum loaded samples set forth in Table 1 have percent NO<sub>x</sub> conversions of 41% or more. Table 4 is similar in this respect. Such disclosure, along with

other statements by Ishibashi, certainly discourages and discredits loadings below 44 g/ft<sup>3</sup> in its specification. Such loadings are higher than Applicant's claimed < 30 g/ft<sup>3</sup> loading. Therefore, Applicant submits that at least for the reason that Ishibashi teaches away from Applicant's claimed invention, the Office Action has failed to present a *prima facie* case of obviousness. Therefore, for at least this reason, claim 9 is patentable over the combination of Rembold in view of Ishibashi in view of Keith.

Independent claims 21, 34, 36-38 and 43, while not identical to claim 9, include features similar to claim 9, as noted above. Accordingly, claims 21, 34, 36-38 and 43 are patentable over the combination of Rembold in view of Ishibashi in view of Keith for the reasons set forth above.

Furthermore, Applicants contend that new dependent claim 50 is patentable over the cited references for at least the reason that Ishibashi teaches away from the combination of a lean burn engine and an emission control system, as claimed, wherein the engine is a diesel engine. Rather, Applicants contend that Ishibashi is directed to catalysts for gasoline engines. Applicants submit that Ishibashi discloses that according to its invention, "the durability of the catalyst is improved remarkably at *high temperatures of 800°C or more.*" (emphasis added) (col. 3, line 47-49). Further, Ishibashi's catalyst is intended to improve durability of catalysts in the high temperature range (col. 2, lines 1-4), meaning high temperatures of 800°C or more, at which temperatures copper-containing catalysts, for example, deteriorate (col. 1, lines 54-57). Ishibashi further discloses exposing its catalyst to temperatures of 800°C to examine catalyst performance. (col. 7, lines 47-57). In contrast, diesel exhaust gas temperatures do not reach 800°C. Thus, Applicants contend that the teachings of Ishibashi are a clear indication that Ishibashi teaches catalysts for gasoline engines, not diesel engines, as claimed in claim 50. Accordingly, dependent claim 50 is patentable over these references for this reason as well.

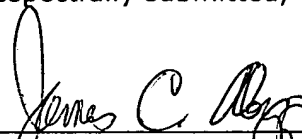
### **Response to Rejections Based on Lane in view of Ishibashi in view of Keith**

The Office Action rejects claims 9, 21, 34, 36 and 37 based on Lane in view of Ishibashi in view of Keith. For the same reasons as set forth above with respect to the rejections based on Rembold in view of Ishibashi in view of Keith, Applicant contends that claims 9, 21, 34, 36 and 37, as well as new claims 38 and 43, are also patentable over the combination of Lane in view of Ishibashi in view of Keith.

## Conclusion

In view of the amendments and arguments set forth above, Applicant submits that claims 9-11, 14, 15, 21-23, 26, 27, 29, 30, and 34-50 are patentable over the cited references. Therefore, Applicants respectfully submit that the currently pending claims, as amended, are allowable. Notice to this effect is earnestly solicited.

Respectfully submitted,



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